CLAIMS

1. The image processing apparatus which converts a low-resolution image to a high-resolution image comprising:

a pixel selection means for selecting a pixel of interest which is located at a position closest to a pixel for interpolation to be newly generated between pixels (hereinafter, simply referred to as "new pixel") and adjacent pixels adjacent the pixel of interest from the pixels of the low-resolution image, respectively, and;

new pixel data calculation means for calculating the difference between the adjacent pixels putting between the pixel of interest, obtaining the amending value on the basis of the difference and the distance between the pixel of interest and the new pixel, and calculating the data value of the new pixel on the basis of the data of the pixel of interest, the difference, and the amending value.

2. The image processing method which converts a low-resolution image to a high-resolution image including:

a pixel selection step for selecting a pixel of interest which is located at a position closest to a pixel for interpolation to be newly generated between pixels (hereinafter, simply referred to as "new pixel") and adjacent pixels adjacent the pixel of interest, respectively, from the pixels of the low-resolution image, and;

new pixel data calculation step for obtaining the difference between the adjacent pixels putting between the pixel of interest ,

obtaining the amending value on the basis of the difference and the distance between the pixel of interest and the new pixel, and calculating the data value of the new pixel on the basis of the data of the pixel of interest, the difference, and the amending value.

3. The image processing program recording medium having stored an image processing program performing conversion of a low-resolution image into a high-resolution image therein, which program includes:

a pixel selection step for selecting a pixel of interest which is located at a position closest to a pixel for interpolation to be newly generated between pixels (hereinafter, simply referred to as "new pixel") and adjacent pixels adjacent the pixel of interest, from the pixels of the low-resolution image, respectively; and

a new pixel data calculation step for obtaining the difference between the adjacent pixels putting between the particular pixel, obtaining the amending value on the basis of the difference and the distance between the pixel of interest and the new pixel, and calculating the data value of the new pixel on the basis of the data of the pixel of interest, the difference, and the amending value.

4. The image processor as defined in Claim 1 wherein:

the pixel selection means is one which selects,

data A of the pixel of interest of the low-resolution image, located at a position closest to a pixel for interpolation to be

newly created (hereinafter, referred to as "new pixel") between

pixels of the low-resolution image having distances of "1" between

adjacent pixels,

data B of upper pixel of the low-resolution image adjacent

the pixel of interest at upper side thereof,

data C of lower pixel of the low-resolution image adjacent

the picture of interest at lower side thereof,

data D of left pixel of the low-resolution image adjacent the

pixel of interest at left side thereof,

and data E of right pixel of the low-resolution image adjacent

the pixel of interest at right side thereof; and

the new pixel data calculation means is one which calculates

data F of new pixel composing the high-resolution image by a formula

of $F=A+(i/2)(E-D)+(j/2)(C-B)$,

on the basis of data A of pixel of interest, data B of upper

pixel, data C of lower pixel, data D of left pixel, data E of right

pixel, and the position of the new pixel (i, j) which are represented

by a distance "i" in the horizontal direction and a distance "j"

in the vertical direction from the pixel of interest to the new pixel.

5. The image processing method as defined in Claim 2, wherein:

the pixel selection process is one which selects data A of

the pixel of interest of the low-resolution image, located at a

position closest to a pixel for interpolation to be newly created

(hereinafter, referred to as "new pixel") between pixels of the

low-resolution image having distances of "1" between adjacent pixels,

data B of upper pixel of the low-resolution image adjacent the pixel of interest at upper side thereof,

data C of lower pixel of the low-resolution image adjacent the pixel of interest at lower side thereof,

data D of left pixel of the low-resolution image adjacent the pixel of interest at left side thereof, and

data E of right pixel of the low-resolution image adjacent the pixel of interest at right side thereof; and

the new pixel data calculation process is one which calculates data F of new pixel composing the high-resolution image by a formula of $F=A+(i/2)(E-D)+(j/2)(C-B)$,

on the basis of data A of pixel of interest, data B of upper pixel, data C of lower pixel, data D of left pixel, data E of right pixel, the position of the new pixel (i, j) which is represented by a distance "i" in the horizontal direction and a distance "j" in the vertical direction from the pixel of interest to the new pixel.

6. The image processing recording medium as defined in Claim 3, wherein:

the pixel selection process is one which selects data A of the pixel of interest of the low-resolution image, located at a position closest to a pixel for interpolation to be newly created (hereinafter, referred to as "new pixel") between pixels of the

low-resolution image having distances of "1" between adjacent pixels,

data B of upper pixel of the low-resolution image adjacent the pixel of interest at upper side thereof,

data C of lower pixel of the low-resolution image adjacent the pixel of interest at lower side thereof,

data D of left pixel of the low-resolution image adjacent the pixel of interest at left side thereof, and

data E of right pixel of the low-resolution image adjacent the pixel of interest at right side thereof; and

the new pixel data calculation process is one which calculates data F of new pixel composing the high-resolution image by a formula of $F=A+(i/2)(E-D)+(j/2)(C-B)$,

on the basis of data A of pixel of interest, data B of upper pixel, data C of lower pixel, data D of left pixel, data E of right pixel, the position of the new pixel (i, j) which is represented by a distance "i" in the horizontal direction and a distance "j" in the vertical direction from the pixel of interest to the new pixel.

7. The image processor as defined in Claim 4, wherein:

when generating the high-resolution image having twice number of pixels in each of the horizontal and vertical direction for the low-resolution image,

the position of new pixel is set by making the absolute value of the distance "i" in the horizontal direction and that of the

distance "j" in the vertical direction from the pixel of interest

be 1/4, respectively, and

the new pixel data calculating means is one which, when

calculating data F1, F2, F3 and F4 of the new pixel located at upper

left, upper right, lower left, lower right of the pixel of interest,

respectively, by $F=A+(i/2)(E-D)+(j/2)(C-B)$, previously calculates

$X=(i/2)(E-D)$ and $Y=(j/2)(C-B)$ and then calculates $F1=A-X-Y$,

$F2=A+X-Y$, $F3=A-X+Y$, and $F4=A+X+Y$.

8. The image processing method as defined in Claim 5, wherein:

when generating the high-resolution image having twice number

of pixels in both the horizontal and vertical direction for the

low-resolution image,

the position of new pixel is set by making the absolute values

of the distance "i" in the horizontal direction and the distance

"j" in the vertical direction from the pixel of interest be 1/4,

respectively, and

the new pixel data calculating process is one which, when

calculating data F1, F2, F3 and F4 of the new pixel located at upper

left, upper right, lower left, lower right of the pixel of interest,

respectively, by $F=A+(i/2)(E-D)+(j/2)(C-B)$, previously calculates

$X=(i/2)(E-D)$ and $Y=(j/2)(C-B)$ and then calculates $F1=A-X-Y$,

$F2=A+X-Y$, $F3=A-X+Y$, and $F4=A+X+Y$.

9. The image processing program recording medium as defined

in Claim 6, wherein:

when generating the high-resolution image having twice number of pixels in both the horizontal and vertical direction for the low-resolution image,

the position of new pixel is made by setting the absolute values of the distance "i" in the horizontal direction and the distance "j" in the vertical direction from the pixel of interest be 1/4, respectively, and

the new pixel data calculating process is one which, when calculating data F1, F2, F3 and F4 of the new pixel located at upper left, upper right, lower left, lower right of the pixel of interest, respectively, by $F=A+(i/2)(E-D)+(j/2)(C-B)$, previously calculates $X=(i/2)(E-D)$ and $Y=(j/2)(C-B)$ and then calculates $F1=A-X-Y$, $F2=A+X-Y$, $F3=A-X+Y$, and $F4=A+X+Y$.

10. The image processor as defined in Claim 1, wherein:

the pixel selection means is one which selects data A of pixel of interest located at a position closest to a pixel for interpolation to be newly generated (hereinafter, simply referred to as "new pixel") between pixels of low-resolution image having a distance between adjacent pixels being "1",

data B of upper pixel of low-resolution image adjacent at upper side of the pixel of interest,

data C of lower pixel of low-resolution image adjacent at lower side of the pixel of interest, and

the new pixel data calculation means is one which calculates data F of the new pixel by a formula of $F=A+(j/2)(C-B)$ on the basis of the data A of pixel of interest, data B of upper pixel, data C of lower pixel and the distance "j" in the vertical direction from the pixel of interest to the new pixel.

11. The image processing method as defined in Claim 2, wherein:

the pixel selection process is one which selects data A of pixel of interest located at a position closest to a pixel for interpolation to be newly generated (hereinafter, simply referred to as "new pixel") between pixels of low-resolution image having a distance between adjacent pixels being "1",

data B of upper pixel of low-resolution image adjacent at upper side of the pixel of interest,

data C of lower pixel of low-resolution image adjacent at lower side of the pixel of interest, and

the new pixel data calculation process is one which calculates data F of the new pixel by a formula of $F=A+(j/2)(C-B)$ on the basis of the data A of pixel of interest, data B of upper pixel, data C of lower pixel, and the distance "j" in the vertical direction from the pixel of interest to the new pixel.

12. The image processing program recording medium as defined in Claim 3, wherein:

the pixel selection process is one which selects data A of

pixel of interest located at a position closest to a pixel for interpolation to be newly generated (hereinafter, simply referred to as "new pixel") between pixels of low-resolution image having a distance between adjacent pixels being "1",

data B of upper pixel of low-resolution image adjacent at upper side of the pixel of interest,

data C of lower pixel of low-resolution image adjacent at lower side of the pixel of interest, and

the new pixel data calculation process is one which calculates data F of the new pixel by a formula of $F=A+(j/2)(C-B)$ on the basis of the data A of pixel of interest, data B of upper pixel, data C of lower pixel and the distance "j" in the vertical direction from the pixel of interest to the new pixel.

13. The image processor as defined in Claim 10, wherein:

when generating the high-resolution image having twice number of pixels in the vertical direction for the low-resolution image, the position of new pixel is made by setting the absolute value of the distance "j" in the vertical direction from the pixel of interest be 1/4, and

the new pixel data calculation means is one which, when calculating data F5 and F6 of new pixel which are adjacent at upper and lower of the pixel of interest, respectively, by a formula of $F=A+(j/2)(C-B)$, calculates $Y-(j/2)(C-B)$ previously, and then calculates $F5=A-X$ and $F6=A+Y$.

14. The image processing method as defined in Claim 11, wherein:

when generating high-resolution image having twice number of pixels in the vertical direction for said low-resolution image, the position of new pixel is made have the absolute value of a distance "j" in the vertical direction from the pixel of interest being 1/4, and

the new pixel data calculation process is one which, when calculating the data F5 and F6 of the new pixel located at upper and lower of the pixel of interest, respectively, by a formula of $F=A+(j/2)(C-B)$, previously calculates $Y=(j/2)(C-B)$, and then calculates $F5=A-X$ and $F6=A+Y$.

15. The image processing program recording medium as defined in Claim 12, wherein:

when generating the high-resolution image having twice number of pixels in the vertical direction for the low-resolution image, the position of the new pixel is made have the absolute value of a distance "j" in the vertical direction from the pixel of interest be 1/4, and

the new pixel data calculation process is one which, when calculating data F5 and F6 of the new pixel located at upper and lower of the pixel of interest ,respectively, by a formula of $F=A+(j/2)(C-B)$, previously calculates $Y=(j/2)(C-B)$ and then

calculates F5=A-X and F6=A+Y.